Automated Gardening System Usage Instructions

How to Run the System:

1. GardenApplication.java:

Purpose: This is the main JavaFX application that provides a graphical user interface to interact with the virtual garden.

Usage: Execute this application to start the simulation in a user-friendly environment where you can manually trigger events, monitor the garden's status, and adjust settings through a graphical interface.

2. GardenSimulator.java:

Purpose: A testing tool used via the API to test the resilience and robustness of the code under various simulated conditions.

Usage: Run this simulator if you wish to test how the system behaves under automated, scripted conditions. This is particularly useful for debugging and ensuring that the system responds correctly to a series of events.

System Overview:

The Automated Gardening System is designed to dynamically simulate an interactive garden environment. It incorporates real-time changes and interactions based on several subsystems and user inputs.

Daily Tasks:

1. Weather and Temperature:
At the start of each day, the system randomly alters weather conditions and temperature to simulate real environmental changes.

2. Pest Attacks:
Random pest attacks are simulated, requiring the system's immediate response to protect the plant health.

3. Humidity Adjustment:
The system automatically decreases the humidity level of all plants by 5 daily to mimic natural drying.

Key Components:

1. Watering System:
Components: Includes water sensors and water controllers.
Functionality: The sensors monitor the plant's humidity levels, triggering the water controller to activate sprinklers if the plants are dry or apply protective measures if plants are overwatered.

2. Temperature System:
Components: Includes a temperature sensor and a temperature controller.
Functionality: Operates similarly to the watering system, where the cooler or heater adjusts the garden's temperature to optimal levels for plant growth.

3. Pest Control System:
Components: Includes pest sensors and pest controllers.
Functionality: Detects pest activities and decides whether to release beneficial insects like ladybugs or apply pesticides.

4. User Overrides:
Description: Users have the capability to override automatic systems via the API, setting specific environmental conditions or triggering specific actions. These user-defined events coexist with daily automated events, ensuring that routine environmental adjustments occur regardless of user interventions.

Plant Types and Environmental Requirements:

1. Trees: Peach, Cherry
Water Level: Minimum 20, Maximum 100
Water Level Thresholds: Minimum 30, Maximum 90
Pests: Aphid, Spider

2. Flowers: Hydrangea, Rose
Water Level: Minimum 10, Maximum 50
Water Level Thresholds: Minimum 20, Maximum 40
Pests: Aphid, Spider

3. Crops: Cherry Tomato, Chili Pepper
Water Level: Minimum 30, Maximum 80
Water Level Thresholds: Minimum 40, Maximum 70
Pests: Aphid, Spider, Whitefly

Temperature Range: 32°F to 122°F
Temperature Thresholds: Minimum 50°F, Maximum 104°F
Optimal Temperature: 77°F

User Interface Usage Instructions:

   1. Layout:
      Our Garden layout includes 15 plots, each capable of hosting a certain type of plant group

   2. Control buttons:
      At the bottom of the interface, we have several control buttons.

Plant button: Allows users to add new plants to the garden.

Water button: Allows users to water a group of plants. Watering an empty plot is now allowed.

Rain button: Only appears when the current weather is sunny, allows users to trigger a rain event with a random amount of rain

Sun button: Only appears when the current weather is rainy, allows users to stop a rain event.

Pest button: Provides three types of pests for users to choose. Allows users to trigger a pest attack event.

NextDay button: Speedup the simulation. Help users jump to the next day.

3. Current plot status: By clicking on each plot, we have a status panel that displays the current plot conditions.

Plot 8 Conditions

Plant Type:	Peach
Plant Number:	5
Humidity Level:	77
Temperature:	77°F
Under Attack:	No
Health:	100

Close